

Curricular Theories And The Curriculum Of The Subjects With A Mathematical Component Of The Civil Engineering Program Of The Universidad De Sucre

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Abstract: The study plan of a university career corresponds to the guidelines that both teachers and students must follow, so that, upon completion of the studies, the objectives proposed within the teaching-learning process can be achieved, in such a way that take as a guide that facilitates and directs correctly, the programmatic content within the educational establishment. It is for this reason that a curriculum of the program that is intended to be taught must be well structured and be consistent with the needs of the labor market both in the present and in the future, to provide students with the knowledge and skills necessary to address professional practice successfully. The present investigation shows some curricular theories and how the study plan of the Civil Engineering program of the University of Sucre is organized, where examples of some subjects are presented and how they are related to each other. Additionally, a survey was conducted to the students of the last semesters of the Civil Engineering program, where firstly, they were characterized demographically and later, questions were asked where they could express their opinion about the study plan of the career, based on their views and experiences along the way. In a complementary way, they were asked questions aimed at observing their satisfaction in the learning process, based on the subjects, their programmatic contents and the forms of teaching, also considering the opinion of the students about the performance of the teachers, in his teaching work.

Keywords: study plan, programmatic content, academic curriculum, subjects

INTRODUCTION

A curricular design is a representation of ideas and actions, in such a way, that it guides in a practical way the conception of the curricular project. Avendano (2015). The curriculum operates as a model to follow what is desired in educational institutions and teachers must develop it effectively, efficiently and effectively. Tyler (1963) and Taba (1962).

The official curriculum goes from the foundation, to the operations that put it into practice, sustained by some mandatory minimum contents of an academic, administrative, legal and economic structure. Cassarini (2002) and Santome (2005). The curriculum is a learning plan in the process and development of the individual, introducing the difference between the study plan and the curricular development itself, where the curricular function is defined as what is done and the curricular structure in how it is done. the function. Hilda Taba (1962) and Thomas Faix (1964).

The curriculum is a document that plans learning and the procedures required to implement, evaluate and modify it, in the light of experience, the result of which is to establish guidelines and lines of intervention. Beauchamp (1968).

The Universidad de Sucre has a document called the Institutional Educational Model, in which the principles, values, fundamentals, philosophy and profiles that the institution considers pertinent for the region and society of Sucre are given. Each Department in its academic programs has its curricular committee, which legislates on the academic work of each subject and contains a series of items. One of these cases corresponding to mathematics, begins with the subject Calculus I or Differential Calculus, assigned in the first semester of the Civil Engineering Program, has the following: in its general information, Subject (Calculus I), Code (235010), Nature (Theoretical), Weekly Hourly Intensity (4), Semester (I), Prerequisites (None), Corequisites (None), requirement for (Calculus II, Physics I and General Chemistry), Credits (three). There are also other aspects such as justification, objectives, skills (knowing, knowing how to do and knowing how to be), synthetic content, general program (by units, themes, sub-themes, strategies and resources), evaluation system and bibliography. Throughout the entire Civil Engineering program, fundamental aspects of mathematics are needed to know the behavior of materials, for which the pedagogical model assumed by the Civil Engineering program of the Universidad de Sucre, which is social-cognitive articulated by behavioral trends that is essential for learning in each of the subjects of the Civil Engineering program.

The pedagogical approach of the institutional educational project is focused on safeguarding the pedagogical, scientific, disciplinary, and technological aspects of the Department and its public nature, subordinating it to the service of the general interests of society, with criteria of equity, without discrimination, or exclusion. , to offer comprehensive training of excellence, with quality processes in a framework of continuous improvement. It represents the educational and training ideology that guides the work of the academic community; It is based on the charter of values and the pedagogical trends used for its development, with

which the positioning of the University is achieved; guides comprehensive training, indicating the path that its members must follow to be good citizens and contribute to the construction of a democratic, autonomous and dignified society. PEI (2010).

The problematizing curricular approach seeks that the student is present in the context of institutions related to the work of the Civil Engineer, as well as in the spaces where the visits and academic practices take place, so that he can identify the existing problem, contribute to the solution of the same, in such a way that the problems detected are the input for the lines of research, whose results will feed back the teaching and will be vehicles for solving problems of the context, thus the knowledge becomes basic, dynamic and changing concordant elements with social problems, which contributes to the construction of a true academic community of the program. This curriculum should allow reorienting academic and social practices to turn them into exploratory laboratories of problems and needs of the context contained in the Educational Program of the Civil Engineering Program. PEPIC(2010).

In its continuous improvement of the curricular processes, the Universidad de Sucre must accept the curricular theory of Follari and Berruezo (1981), which establishes as criteria for the review of study plans, analyze its definition of the profession, determination of the professional field and have defined the pedagogical structure of the study plan.

The curricular structure of the Universidad de Sucre corresponds to the official curriculum that is built by everything that the school offers through certain manifest and public purposes and plans, which act as a reference in the organization of the curricular system and serve as a starting point for the material processing and system control. Elliot (1979) and Sacristan (1994).

The curriculum of the Civil Engineering program at the Universidad de Sucre is very much in tune with what Johnson (1967) proposes, where it is stated that it is a series of structures that try to have learning consequences, relating the contents that students must learn, with the following aspects that are common to the institutional curriculum of the Universidad de Sucre: it tries to have consequences in learning, the selection in its formulation, its structure, it is an instruction guide, its evaluation involves the validation of both the selection and structure, is a fundamental criterion for evaluation.

The curriculum of the Universidad de Sucre must be of integrated code, where all teachers relate socially, cooperating with each other, working as a multidisciplinary team with horizontal relationships between teachers-students and directors, which contribute to the visibility of our model, which allow the construction of societies and academic communities capable of assuming the risks and challenges for the continuous improvement of education. In this sense, the integrated codes can provide the conditions to strengthen the training processes of their students. (Bernstein, 1967).

The Universidad de Sucre has in its way of carrying out the curricular evaluation a comparison between the objectives and the results, showing the deficiencies, which are later corrected and the objectives set within the curriculum are fulfilled in order to have continuous improvement. Stufflebeam and Schinkfield (1987).

The practical curriculum conceives the student as a subject capable of understanding and interpreting his reality and the critical curriculum conceives the subject as a being who can understand his reality and also transform it. It can be said from what is stipulated in the theoretical foundation of the PEI of the Universidad de Sucre, teaching and learning in the classroom and outside it, shows both types of curriculum. Grundy S. (1998).

The rights and duties of individuals promote harmony and prepare students to respect the decisions of the majority. At the same time, it declares the importance of rescuing the singularity of the person in a unique and unrepeatable being; to encourage their ability to be autonomous and make their own decisions and promote critical, divergent, flexible and creative thinking in the educational act, through communicative action. Habermas (1981).

A curriculum is an attempt to communicate the essential principles and features of an educational purpose in such a way that it remains open to critical discussion and can be effectively translated into practice. Stenhouse (1987), which is being developed in the program, because the curriculum is never finished, but rather is enriched over time.

MATERIALS AND METHODS

In order to have a better understanding and to see the repercussion from the point of view of the students, that these have on the programmatic contents of their career, the authors of the present investigation decided to

elaborate a survey in students of last years of the civil engineering degree from the Universidad de Sucre. The survey was prepared in a Google Forms form and distributed to students through digital means such as WhatsApp messages or email correspondence. The selected population corresponds to students who are studying in the seventh, eighth, ninth and tenth semesters of the Civil Engineering career, who have complete or almost complete knowledge of the contents of their undergraduate curriculum.

The survey was structured in three remarkably differentiated parts: the first part of the questionnaire, corresponded to the sociodemographic conditions of the students, in order to know the general data of the students and the social conditions, as well as their demographic characteristics; The second part of the survey was focused on knowing the opinion of the students about their academic curriculum, so in this section questions were asked about the number of subjects, semester load, strengths and deficiencies in the programmatic content, opinion about the professors and their teaching and evaluation methodologies, accompaniment in work, use and infrastructure of the technological component, command of a second language, carrying out research work, adaptation of the curriculum based on the

needs and requirements of the students, among other; To finish, the third part of the survey consisted of a satisfaction form, where the students expressed their point of view about the subjects of the Study Plan, the Knowledge and Performance of the professors and the infrastructure of the University to develop the pensum to satisfaction.

RESULTS AND DISCUSSION

The survey carried out provides valuable information to the researchers, with which they can have an image of how the students of their career perceive the academic curriculum and can provide relevant information for the continuous improvement of it. The results of the survey carried out on Civil Engineering students are presented below.

With the survey data, Figure 1 was constructed, which shows the distribution of the students surveyed in the different academic semesters that they are studying at the time of answering the questions, it is observed from this figure that more than 50% of the students They are in their last year of college.

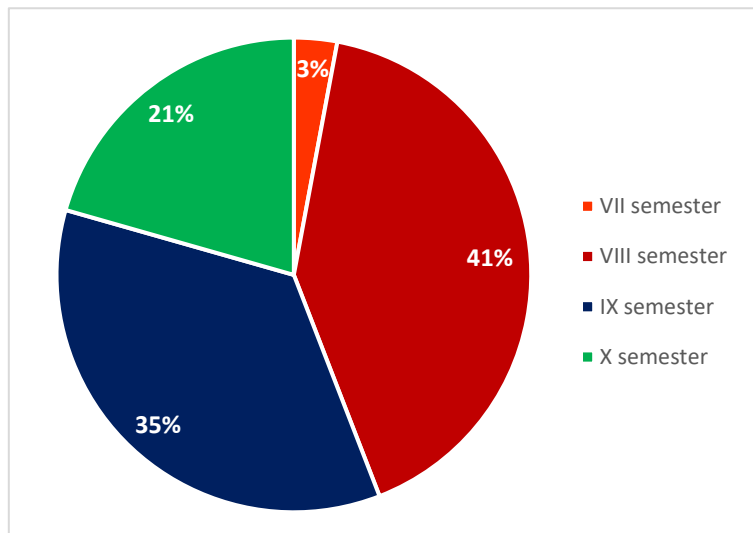


Fig. 1. Six-monthly distribution of Civil Engineering students

The information collected also provides information on the age of the respondents, where it was found that the ages of the students range between 20 and 33 years, noting that the average age is 22 years. Additionally, a third of the respondents are women and the rest are men. Regarding their place of origin, it was observed that 24% come from a rural area and 76% live in an urban area and in terms of their housing situation, 35% stated that they own their own home, 35% rented and 30% of family origin. Regarding the economic income of the family nucleus, it was noted that 74% of the respondents have monthly income close to the current legal minimum wage in the country for the year 2022 and only the remaining 26% have salaries between 1 and 2 minimum wages, which is considered relatively low and could explain the fact that more than 50% of students continue their studies while doing some work

activity, with the aim of having additional resources for their maintenance. The foregoing can also explain that 59% of those surveyed would prefer that their academic activities be carried out in a mixed way (face-to-face and virtual) or virtual, instead of face-to-face, which is the method chosen for the remaining 41% of the sample. .

On the other hand, to evaluate the dedication of the respondents in relation to the hours of study in person and virtually, Figure 2 presents the results by intervals or ranges of hours. It is observed that there is a small increase in the number of students who study more than 20 hours in virtual mode, in the range of 5 to 10 hours there is a higher proportion of students in the dedication in virtual classes and the behavior is reversed in the range of 15 to 20 hours of study.

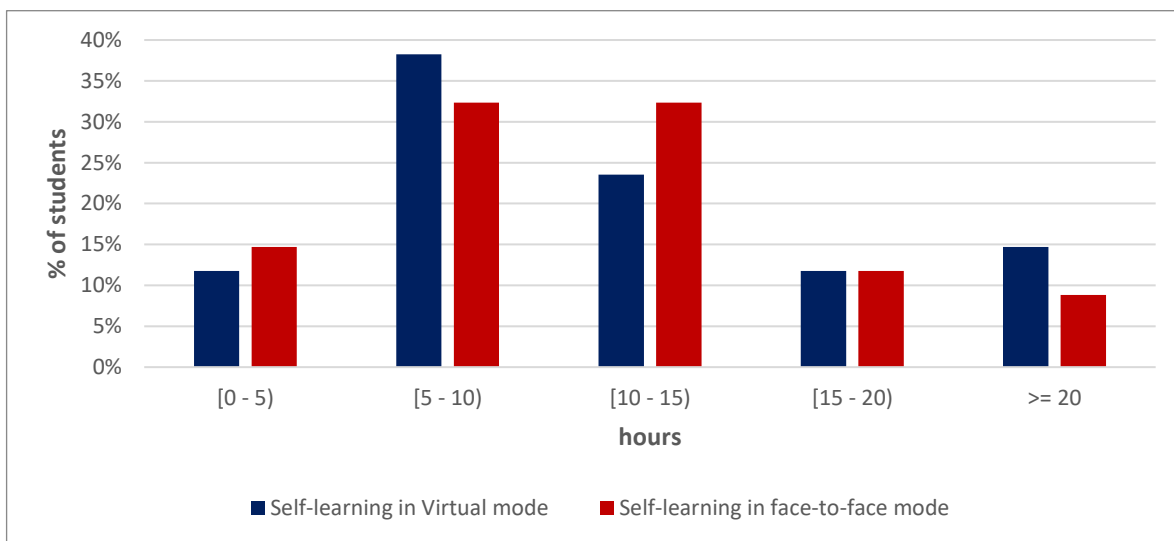


Fig. 2. Distribution of hours of self-study in virtual and face-to-face mode

The survey also sought to characterize the learning styles and methods of the students, which are presented in Figures 3 and 4, respectively. From the Figures in question, it can be seen that the most common learning

style among students is practical, followed by theory, for which the programmatic content should be closely framed in these two learning styles that students prefer. . On the other hand, in the case of learning strategies, the most used are explanations and questions and answers, which is why it should be sought that an environment is fostered within the classroom where these types of teaching/learning strategies are provided.

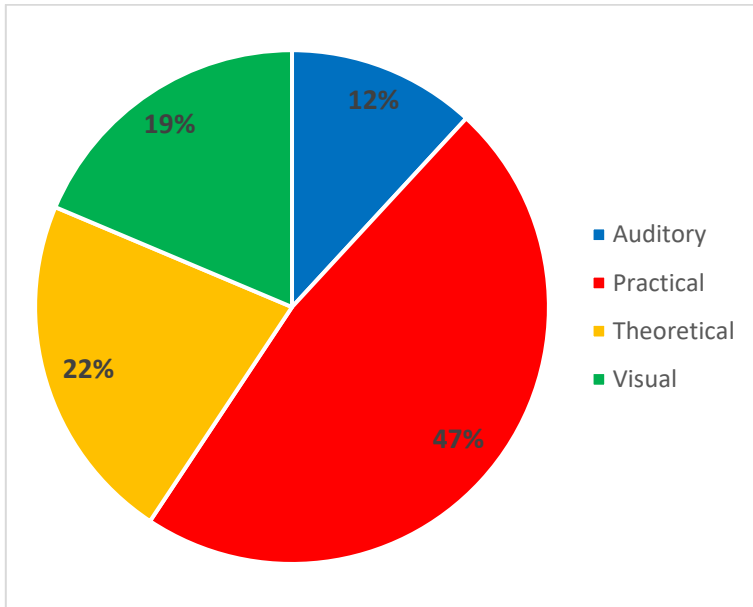


Fig. 3. Student learning styles

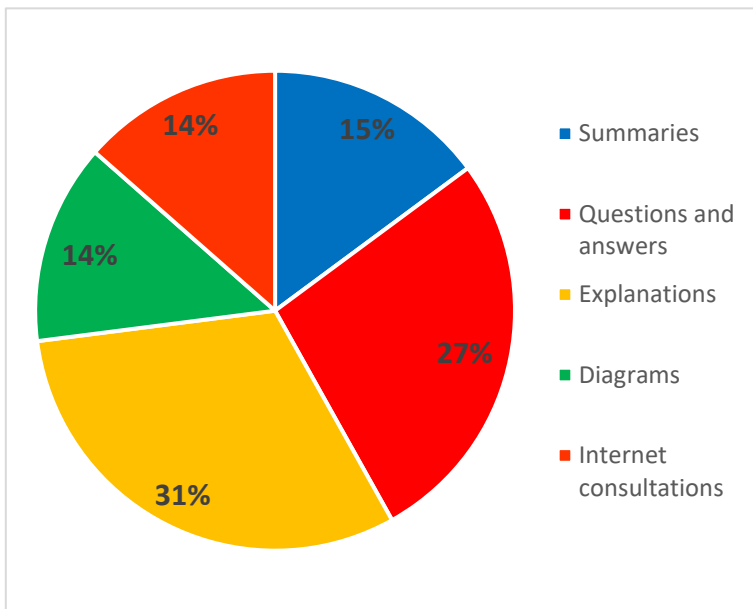


Fig. 4. Student learning strategies

The questionnaire continued with questions related to the experience that students had had in the course of their classes, in the different semesters, where they had the opportunity to give their opinion in a general way in relation to different topics. In relation to this topic, 58% of the students answered that the practical projects that are assigned in their career help them to enter the professional practice, while 42% of the students conceive it as being given partially. What is interesting here is that no student denies the usefulness of the assigned work in relation to professional practice. In the same way, 44% of those surveyed believe

that teamwork environments are proposed in the courses that develop collaborative work skills, while the remaining 56% believe that it occurs in some subjects and not in others. On the other hand, in relation to the use of information and communication technologies, as well as the use of cutting-edge engineering software for the development of classes, 59% agree that these types of tools are used in the subjects. technological, as opposed to 41% who affirm that spreadsheets are used with basic programs. In relation to learning a second language, something worth noting has been found: 65% of the students think that some subjects are given to fulfill this purpose, but it is insufficient for mastering the second language, 20% look the situation and say that there are no subjects that help to meet this objective, while only the remaining 15% think that the subjects are sufficient. This last piece of information is important, because it can help in the evaluation of the current curriculum and in its improvement, in order to ensure that civil engineering students graduate with a sufficient level of English to face the challenges demanded by today's globalized world. .

The following questions of the survey were aimed at observing the perception that civil engineering students had, in relation to the content of subjects within the program, both in the basic areas, as well as in the core of engineering and the deepening or elective subjects.

With respect to the basic areas, 2/3 of the surveyed sample agree that the subjects of the first semesters or basic component of the career, is in accordance with the curriculum of a civil engineering program, while the remaining third disagrees of this statement. On the other hand, in relation to the elective or deepening subjects, 56% think that the catalog of subjects is insufficient and there should be other electives in some areas, while the remaining 44% are satisfied with the number of deepening subjects. and electives.

In addition to this, the students were asked to give their opinion, according to their experience in the program, about which subjects within the main component of the career are in excess and which were lacking by areas of knowledge. The results found are presented in Figures 5 and 6.

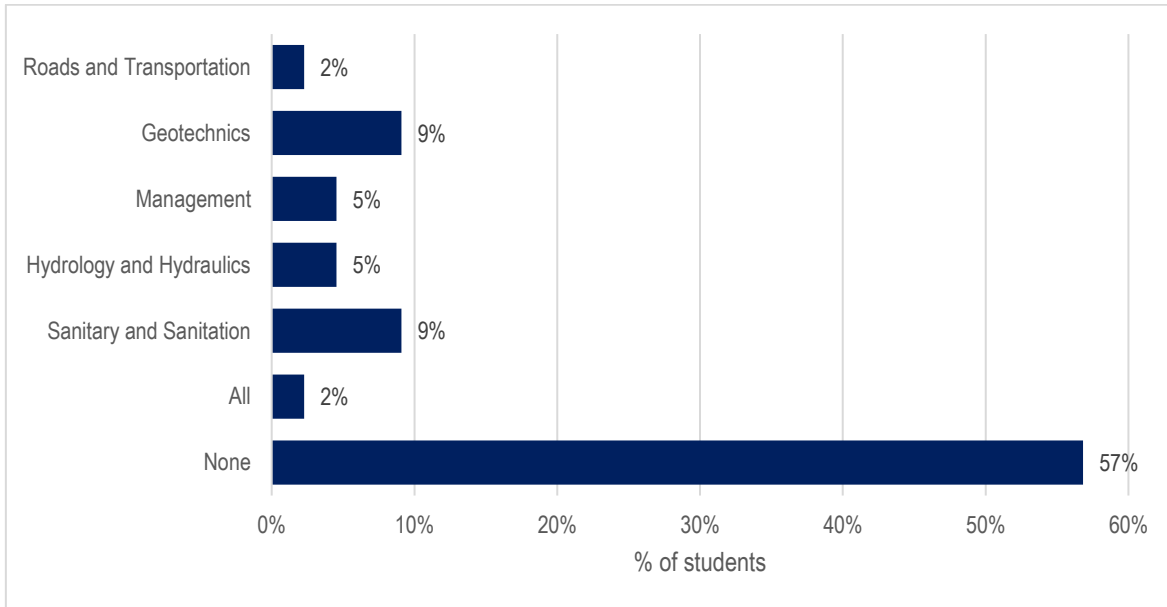


Fig. 5. Career areas with EXCESS of subjects offered

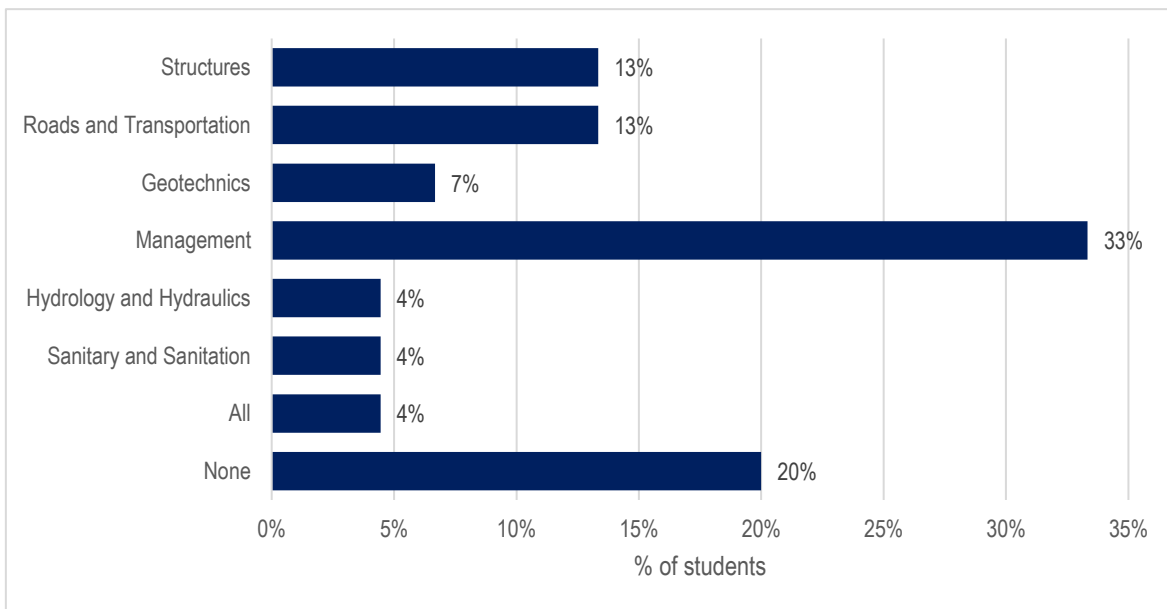


Fig. 6. Career areas with LACK of subjects offered

Figures 5 and 6 are based on the tastes and preferences of students in certain areas of the career and give their opinion on which have subjects that could be removed or added, respectively. In the case of excess subjects, more than 70% believe that there are no excess subjects and those who affirm that there are excess subjects, say that they are mainly in the areas of Structures, Geotechnics and sanitation. In the opposite case, there are three subjects that believe that more subjects are needed and these are Management with 44%, Roads and Transport, as well as Structures, with almost 20% each. Which could give indications that

most students have a preference for these subjects and have a desire to delve deeper into them.

The survey also contained questions related to the experience that the students had with their teachers, finding that the students have a very positive concept of their teachers. In the case of the preparation of teachers, all believe that they are well trained, although 30% of the students believe that the process of transmitting

knowledge is somewhat difficult for some. Another positive data was also found, which states that almost 100% of teachers socialize the study program before starting classes and fully complete all the course content before the end of the semester. In addition, 70% of students say they feel heard when making changes to the course content, with the teacher's prior approval, as long as they meet the objectives of the subject, while the other 30% say that teachers are rigid in the programmatic content and do not allow modifications. In the research area, it was found that half of the respondents see many options to carry out research within the course of their academic exercise, while the other half thinks the opposite.

To finish this section of opinion questions, the students were asked if the subjects taken throughout the degree have contributed to their integral formation as a person, so that they can stand out for their high human, ethical, academic quality. , professional and for his social responsibility, as well as that the content of his career has helped him create and develop knowledge and culture from a critical and innovative perspective. In this sense, more than 90% of those surveyed gave an affirmative answer to both questions.

The final section of the survey consisted of asking several satisfaction questions of the students, related to their experience during the course of their university classes, in relation to the academic curriculum. The questions and their level of satisfaction are presented below.

Table 1. Level of Satisfaction with the Academic Pensum

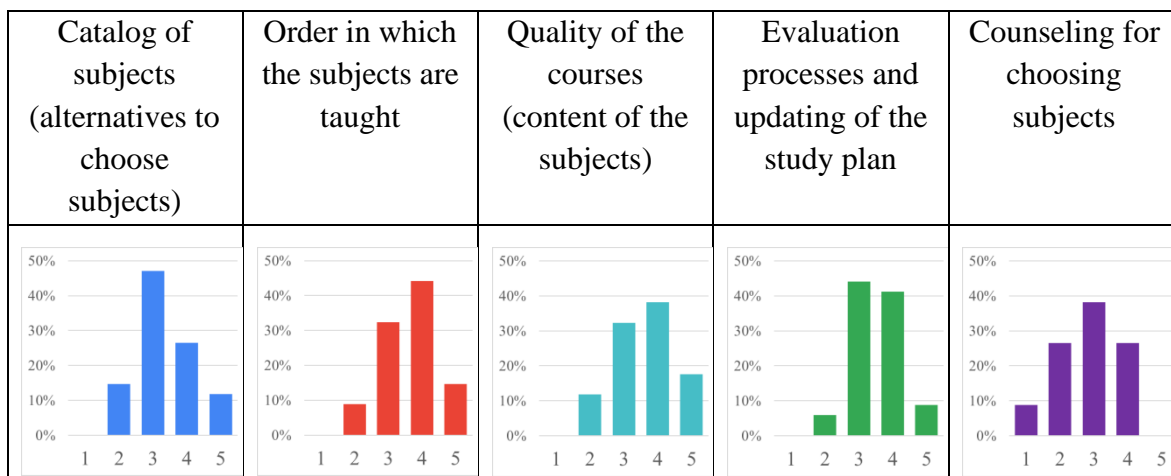


Table 2. Level of Satisfaction with Teachers Teaching

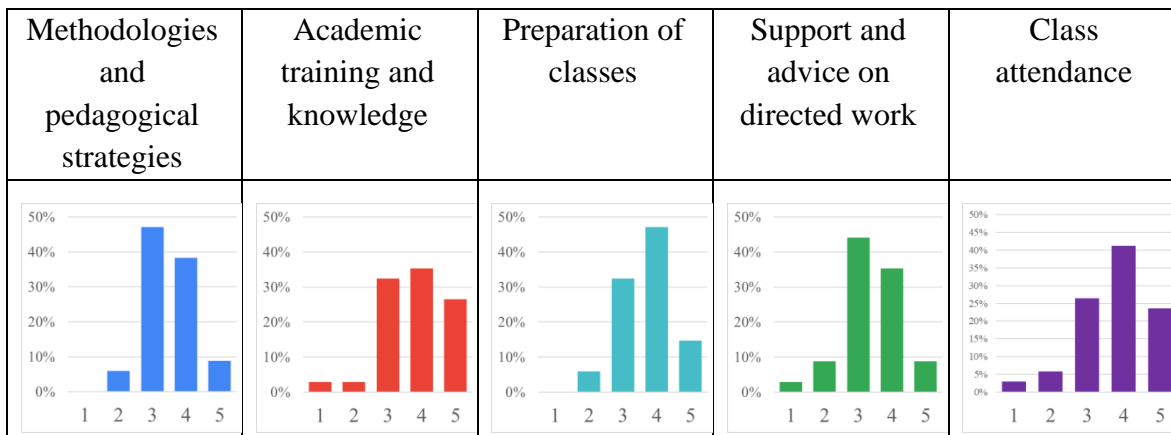


Table 1 presents the satisfaction of the students in relation to their experience with the Study Plan of the career, throughout their training and Table 2 shows the level of satisfaction evaluating the teachers in the different scenarios and roles they play. in his teaching role. The Satisfaction Levels were taken as follows:

- 1 = Very Dissatisfied
- 2 = Dissatisfied
- 3 = Normal
- 4 = Satisfied
- 5 = Very satisfied

CONCLUSIONS

The elaboration of an academic program or pensum is a job that requires a detailed study of the needs of the medium where the graduated professionals will be incorporated, of the needs and tastes of the students, of the particular conditions of the teachers, of the conditions of the area where the training is developed, of the competition at the local, regional, national and even international level in the same area, in training and research, of technological advances, of the resources of the educational establishment, among many other factors that condition the planning and elaboration of a study plan, in this case of a university type; For this reason, it is not an easy task to carry out satisfactorily and at the same time generate full satisfaction in all the parties involved.

In the present investigation, it was possible to observe from the experience and testimony of the last year studies, how they perceive the curriculum of the university career, which they have studied four years or more, being able to notice that there are things that are very successful in the curriculum. of the university and others, which, based on the opinion of the students, could be improved. This type of exercises is very valuable, because it provides

information that is often overlooked in the planning of an academic curriculum, for which the results consigned in this document can serve as a guide to prepare or plan more in-depth studies or be taken as starting point for the evaluation of academic curricula or for the planning of new ones, where not only the students are taken into account, but all the members involved in the process, giving rise to the creation of an academic program that is more focused on the needs of students, teachers, academia, needs of the environment, research area, among others, that are related to the academic program of the career.

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